

§4.6A: Amplitude and Vertical Shifts

“I WILL...

...identify all amplitude and vertical shifts of given information”

I. Transformation of Graph Equation

A. Equation: $y =$ _____

B. A is the amplitude

1. a : vertically stretches by a factor of a ,
2. $\frac{1}{a}$: Vertically compresses by a factor of $1/a$

C. B is the period or frequency

1. *Period equation*: $\frac{2\pi}{B}$ for sine and cosine, $\frac{\pi}{B}$ for tangent
2. B : horizontally compresses by a factor of $\frac{\pi}{B}$
3. $\frac{1}{B}$: horizontally stretches by a factor of b
4. $-b$: Reflects over the y -axis

D. C is the phase shift

1. If there no GCF taken out, divide the coefficient

E. D is the vertical shift

<p>Ex 1: Describe the transformation(s) of $y = 4 \csc x + 1$</p>	<p>Ex 2: Describe the transformation(s) of $y = -\frac{1}{2} \sin 4x - 2$</p>
<p>Your Turn: Describe the transformation(s) of $y = 5 \cos x + 3$</p>	<p>Ex 3: Given $y = 4 \sin\left(\frac{1}{2}x + 1\right) + 3$, identify amplitude, period, vertical shift, and phase shift for one period.</p>

Ex 4: Given $y = -2 \cos(3x - 4) - 1$ identify amplitude, period, vertical shift, and phase shift for one period.	Your Turn: Given $y = \sin 2(x + \pi) - 1$ identify amplitude, period, vertical shift, and phase shift for one period.
Ex 5: Given $y = 2 \tan\left(3x - \frac{\pi}{2}\right) - 1$ identify amplitude, period, vertical shift, and phase shift for one period.	Ex 6: Given $y = 5 \sec\left(3x + \frac{\pi}{7}\right)$ identify amplitude, period, vertical shift, and phase shift for one period.
Your Turn: Given $y = 3 \sec\left(x + \frac{\pi}{4}\right)$ identify amplitude, period, vertical shift, and phase shift for one period.	Ex 7: Given $y = -\frac{1}{2} \tan\left(-3x + \frac{\pi}{6}\right)$ identify amplitude, period, vertical shift, and phase shift for one period.
Your Turn: Given $y = -\cot\left(2x + \frac{\pi}{4}\right)$ identify amplitude, period, vertical shift, and phase shift for one period.	